

WALDO L. SCHMITT -- TORTUGAS NOTES

1924

July 15, 1924

~~Six a.m.~~ put off for Tortugas. Trip was uneventful. Passed Man and Woman Key; Rebecca shoals lighthouse; Fort Jefferson, now deserted, and coal sheds, with twisted crane and unroofed buildings blown down in big hurricane. Fort probably is just as it was in Civil War days.

Trip is about 60 nautical miles, launch goes about $9\frac{1}{2}$ to 10 knots; 6:30 - 2:30 to island. Cost \$39,000 to build, and \$50,000 - \$60,000 to duplicate today. 70 feet, 100 h.p., 16 gals. gas per minute. Allison has one that burns 1 gal. per min., 30 knot boat; used it to collect fish for station. He had been led to expect that lot of "Gudger". Science would be carried on there [at Tortugas].

Laboratory [has] two large buildings for lab purposes. Southernmost has southern section forming one long sleeping porch. Dr. Grave and I are in northern building. Bird Key formerly Hospital Key - dead and dying yellow fever patients from Fort. Ports were all broken out at time of yellow fever epidemic by Prison Doctor, who was given charge.

Wednesday, July 16, A.M.

Trip to Fort Jefferson in the a.m.; returned about 10:30. Dr. Grave got a little dromid under an ascidian and I found a few small spider crabs, Mithrax species.

Wednesday, July 16, P.M. Bird Key Reef

Bird Key Reef over end near Fort Jefferson, except last bit on islet across five-foot channel, and nearest the Fort.

Dr. Longley secured one Portunus (Achelous) sebae and one Petrolisthes.

Color notes made:

Crangon formosus

Crangon armillatus - (Large female hatched eggs. Sound is made when fingers close. Saved in picric like some of young which were observed morning of July 18. Water had been changed night of 17th.

Crangon near armillatus

Petrolisthes armatus

Mithrax sculptus

Mithrax pilosus

Portunus sebae

July 17, 1924, Thursday. Dredged with the Dohrn. At 2:30 made several dredge hauls. All coral sand and lithothamnium bottom except last haul, which had mostly algae and fine sand. First haul most mushy; also except last slimy.

White Shoal #15.

1. White shoal #16, 7-8 fms. Largest squilla scarlet morning day after collecting.

Had died in bucket over night; other squillas natural looking -- grayish-white.

1a. White Shoal #16.

3 squillas

5 Mithrax, 2 species

1 Stenorhynchus

1 Hemus-like

1 red-speckled, but practically white-appearing aphid

1 Synalpheus, different species from other taken this day.

Few worms.

2. White shoal haul #17.

Synalpheus sp. Bird Key 7 - second haul of day. Boat dredge $10\frac{1}{2}$ fms.

3. White Shoal #18

1 Gebia

4 Amphipods

4 Mithrax, 2 species

1 Hemus-like

1 Cymothoa

4. White Shoal #19

1 Ebalia and

1 abdomen of shrimp

July 18, 1924. Friday.

Bender caught crab by Mayer Monument - Gecarcinus lateralis, and a hermit on rocks below lighthouse. Went dredging with Taylor; made a haul before 12 o'clock and several after. No dredged specimens. Dexter speared half dozen lobsters near Bird Key this a.m. Had set traps last night west of Loggerhead Key and caught nothing.

1. East Key #1.

Ocypode and eel grass on beach for amphipods.

2. Middle Key, shore collecting in 3 ft. of water from algae.

1 Palaemon tenuicornis, color noted

1 Pitho, dirty white with least touches of pea-green on central anterior portions.

1 tiny Mithrax, with similar markings, ~~b~~ice green however.

1 Clib. tricolor

1 little gray squilla

3. Middle Key #1

Debris saved, one bottle only. Bottom coral, sponges, alcyonarians, coral sand.

4. Middle Key, Sta. #2. Lithothamnium coral.

1 Pitho

1 Libinia-like with speckled hands, ~~and~~ carpus and spots almost maroon, fingers and hands otherwise white, as is carpus below.

5. Sand Key #1. Middle ground, 50 yds. west of Key in 25 ft. water.

1. Podochela riisei? Color the faintest kind of olive buff.

6. Sand Key on rocks just below water at high tide.

9 Clibanarius tricolor

3 small Mithrax from filamentous green algae and marked with dirty white and ~~b~~ice green.

7. Sand Key #2, changed to White Shoals #20.

Bryozoa only saved, ~~mainly~~ mainly encrusting coral stalks.

July 19, 1924, Saturday. Made eight dredge hauls with Dohrn off Loggerhead Key, using boat dredge. All hauls made between 9:00 a.m. and 12:00 noon.

White Shoal #21. Lots of sponges, some gorgonians, Halimeda in abundance.

1 Stenorhynchys
1 small octopus
2 species Mithrax, clay color and dirty white.
4 xanthids, cocoa color.
1 Pitho
2 squilla
3 Petrolisthes as in Haul 21
1 Hemus-like, crimson
1 tiny isopod, mottled hazel and white.
1 ochre yellow ostracod
1 large hermit
1 little alpheid, mottled with flesh color, eggs Parrot green.

White Shoal #22

2 hemus-like, large one ^{orange} ~~organs~~ vermillion, small one rufous
1 Synalpheus
1 Portunid, sand color
1 Ebalia
1 Portunid, legs cross banded with ferruginous
1 Bicornutus, chelipeds salmon with chestnut fingers, otherwise sand color, corneae transparent with black hole in center
2 Petrolisthes, n.sp.?

July 19, 1924, Saturday - Continued

Station #23.

1 Pitho with bice green markings

1 Xanthid, fingers dark burnt umber, whitish apices, hands pink flesh
on inside and between articulation of fingers on outside

1 Mithrax with faint vinaceous-rufous markings

Rain out of cloud out of a clear sky at 5:00 p.m. Very heavy and driving.

Station #24.

1 faint salmon tinged Pitho

2 straw yellow squillas and 1 buff

Squilla, largest one, transparent vermillion

1 Hemus, poppy red and carmine

1 much broken Synalpheus

1 Synalpheus and Palaemon, pinkish slightly pinkish only in color

July 20, 1924, Sunday. Out with Dohrn. White Shoals Stas. 29-37.

Stations 29-32 combined. 5 miles south of Loggerhead Key, depth 7-10 fms.

Called White Shoals stations by Taylor, but one situation above.

1 coral sand, grey white Dromia, with touch of vinaceous rufous on proximal upper half of movable finger and few dots of same color across base of fixed finger.

1 baby Calappa, white

1 white Upogebia. Alimentary tract in abdomen looks salmon color from above; eggs cadmium or green with black ocelli. Hands above and movable finger faint hazel; eye black.

2 Synalpheus. Larger one white alimentary tract in carapace and anterior third of abdomen lemon yellow. Legs, chelipeds, first and second antennae with small, widely spaced crimson spots, not seen by naked eye, about 2 mm. apart on legs, more on palm, closer on base of movable finger.

Sta. 33 had large loggerhead sponge; amphipods barred with maroon and wine-purple, and 1 Pisosoma ~~with~~ and some whitish transparent chelipeds and pale rose red Synalpheus. ??

July 20, 1924, Sunday. Out with Dohrn; made White Shoals Stas. 29-37.

Sta. 34.

Got lot of Synalpheus from Loggerhead sponge 6x6" in diameter

2 small spider crabs, larger vinaceous buff

1 small squilla, apple green

1-inch Mithrax, madder brown

1 amphipod

2 juxtaposed horned spiders. Median raised areas pea-greenish white, mostly white; lateral areas light rufous; all dorsal spines, except for extreme white tip, pale rose red. Legs faint vinaceous cinnamon,

July 20, 1924 - Continued

legs, spinules pinkish vinaceous; basal 2/3 of movable finger between peach blossom pink and rose red, distal 1/3 hazel with extreme tip white and narrow band of white between red and hazel. Fixed finger basally like palm, distal 1/3 hazel, extreme tip white.

1 brownish cross-barred alpheid like other day. *fig*

Saw a water spout in afternoon.

Stas. 35 & 36

1 barred alpheid as above

Stas. 35-36-37 combined. Station 37 nasty, slimy haul.

1 Podochela

1 Petrolisthes, n.sp. Always done up as result of dredge haul.

1 Same of *Gumopolias* ^{sp.?}

Portunid, sand color

1 Stenorhynchus

4 long-nosed spiders (1 bice green markings, 1 sand white, 2 with lateral touches of light ochraceous rufous)

plain

6 Gonodactylus, all different (1/ferruginous, 1 almost plain peach

blossom pink, 1 sand grey with white spots, 1 orange ochraceous with white spots laterally, 1 myrtle green with white spots laterally, 1 vinaceous cinnamon with white spots laterally, with coral red alimentary tract)

1 blue eyed hermit

1 white hermit

1 soft Hemus-like, orange vermillion

(What I have been carelessly calling Mithrax often have been *Cympolia* with Chinese orange, flesh color, or ochraceous rufous markings, but always very light; usually they are sand colored, always come up in Halimed bottom.)

July 20, 1924 - Continued

Stas. 35-37 Cont.

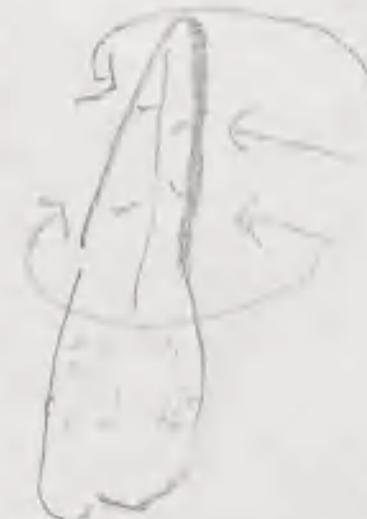
1 dished out two-horned spider, = vermillion below and legs, upper disk = burnt carmine or wine purple

Heterocrypta, dirty, china white, like old coffee-stained cup, touched with pea green on distal half of rostrum and a little on either side and tops of hands; carpus on right side touched with bay, on left with faintest touch.

1 white hermit, pearly, slightly opalescent white; cornea snowy white with tiny red (orange vermillion) flecks all over. Ring of madder brown just above base of cornea, touching point as shown and just about (above?) base.  Legs most faintly striped with broken bands of madder brown and cerulean blue with white chromatophores against glass transparent translucent ground. This is what makes it look opalescent. Carapace with few very faint touches of the brown on anterior portion, rest clear with opaque white chromatophores. Only one cheliped to hand has fingers with thread thing transverse bands as shown:

Few very faint touches

of the brown



Hermit came out of white Bulla-like shell in 8-oz. bottle.

Pisosoma, right arm cream color, left hand walnut brown, carpus with few touches of olive.



Cream touched with vinaceous buff

Darker mottlings of olive and clay color

Legs and under parts orange rufous, eggs wine purple.

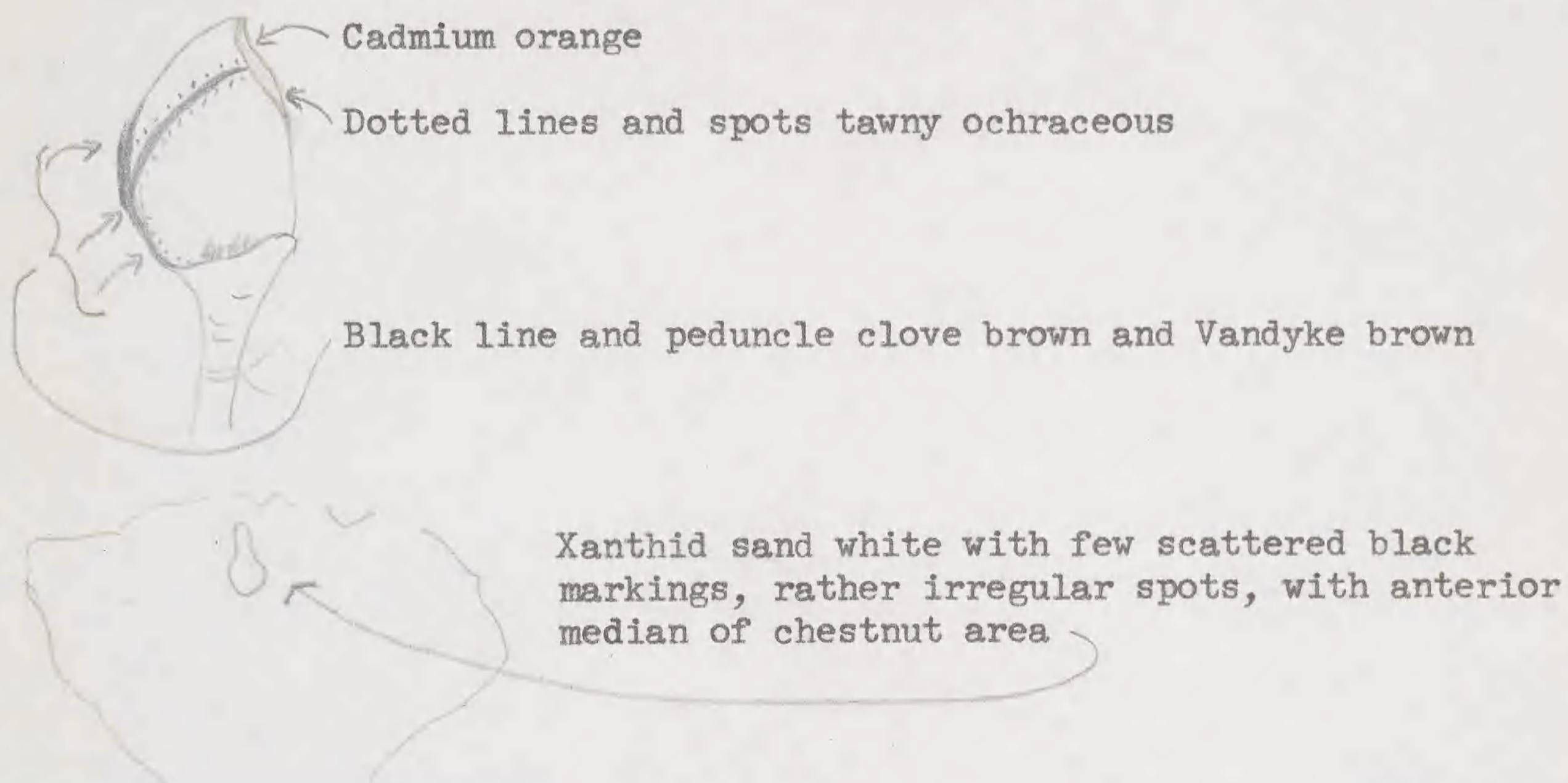
July 21, 1924, Monday

Collected on reef, rather rocks, west of Lighthouse, between 8:30 and 10:30 a.m.

Saw a Mithrax about $2\frac{1}{2}$ -3" across carapace.

Got several Clibanarius tricolor and one small Paguristes grayi, maroon white speckled, like one color noted a few days ago.

1 Xanthid, several small Pachygrapsus.



Decorator spiders (Microphrys bicornutus) greenish above ~~and below~~, and below sage green, lighter below. Hands mottled only, mottled with chocolate on fingers and tending to olive on palm

Dr. Grove and Bender brought in from Fort one large Grapsus and two decorator spiders—largest and one with Ascidian in above bottle. Latter has purplish cast, dark maroon purple, to carapace, and mottlings on hands.

Night of July 21, 1924

Clear starlight at about nine o'clock, with lightning flashing in distance. Noticed 2 or 3 intermittent spots of greenish phosphorescence floating 10 or 20 yds. off shore. One flashed (glowed) again some minutes later close to beach. I ran down and some minutes afterward, maybe only one, saw

July 21, 1924 - Continued

it glow in sand - very brightly, a bluish light, intensely strong, from a little ostracod size of half a grain of wheat. Lasted long enough to show every one, carry to lab, half way back in bottle, to lab again in bottle, in alcohol for few minutes.

Notes: Mithrax everywhere, rocks and reef. Cymopolia and small Xanthids in dredge hauls, Pachygrapsus in rock crevices, on piles, ? on reefs covered at high water. Grapsus grapsus runs over brick walls of Fort, as does Ligia.

July 22, 1924, Tuesday.

At six Dr. Longley woke me up. Rowed out and saw Palolo swarming, sometimes as many as 6 worms to a square foot, more often worms were a foot or two apart. Large grey ones with distended after bodies [were] females, coral (or salmon?) red ones, in many cases as large as females, [were] males. Performed spiral wriggling. Body was smoke grey in case of females; eggs shed in water of appreciable size, looked as though one had broadcast coral sand on water. Fore parts of body burnt umber, or as light as drab.

Ocypode combs water and sand off eye stalk with palp of maxilliped.

Dredged with Dohrn. Dr. Longley went along; had very good luck with net superimposed on boat dredge. Made stations 38-44 inclusive. (Dohrn goes about 9 miles per hr.)

Sta. 38

No. 2

Steamed due south from southern channel/buoy 25 mins., 4-5 miles, dredge in 40 fms.? (Some mistake about time; check or leave out; depth is O.K.) Udotea, and sand bottom, 15 min. tow.

Sta. 39

Same bottom, 15 min. haul.

Sta. 40

20 fms.? At 10:20 a.m. 15 min. haul. 7 miles south.

Sta. 41

Steamed from last haul, 10:25 a.m. to 10:45 (20 min. 2 miles), sounded= 40 fms.; 11:00 a.m., 40 fms.; 11:18 a.m.,=60 fms.; 11:36 a.m.,=75 fms. At 12:30 were washing through gray ooze. (15 miles south of buoy.) Headed north at 12:30 p.m. [Sta.] 41 had at least 5 sp. Pteropods.

Sta. 42

At 12:55 p.m. Had some ooze bottom as 41. Sounded at end of haul, 50 fms. (10 miles south)

Sta. 43

At 1:30 p.m. Soft white sand, 45 fms. Considerable sponges and bryozoa, few algae.

Sta. 44

At 2:00 p.m. 15-min. tow, net on deck at 2:27 p.m. 18 fms. Sponge belt, coarse sand. Passed buoy homeward bound at 3:15 p.m.; off end of ⁶ island at 3:40. Figure that Sta. 44 was about $\frac{6}{7}$ miles due south of buoy.

July 23, 1924, Wednesday

Dredged with Dohrn again; made Stations 45-51 inclusive.

Loggerhead Buoy #10

Sta. 45

8:40 a.m. passed western Buoy. Net over at 8:45 opposite buoy (M; 115 net); lost gear heading west, sounded at 9:25, 19 fms. Haul at 9:30, fine grey sand, net badly torn. Caulep~~ora~~ and sand, few starfish, fine broken shells. (3½ miles west of No. 10 buoy) 10:08 sounded in 20 fms.

Sta. 46 8 mi. S.W. of No. 10 buoy

Coarse sand, few algae, 1 alcyonarian, 1 Portunid. Under way after haul at 10:30.

Sta. 47

10:45 - 30 fms. 11:00, dredge on deck, dark black and grey coarse coral sand. About 11 miles S.W. of "Loggerhead" No. 10 buoy.

Sta. 48.

About 10 [mi.?] south of No. 10 buoy. 40 fms. at 11:20. Fine grey, soft muddy sand - grey ooze, some saved.

12:20 headed east. Sounded at 1:00 p.m., 30 fms. Loggerhead Light due north.

Sta. 49.

Net in at 1:25. About 9 miles south of No. 2 buoy. One coral head 8x12x6 inches, some algae.

Sta. 50 . Last Sta. Dohrn, Monday, July 23.

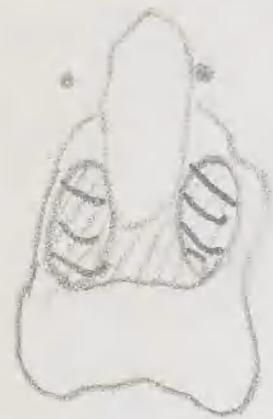
Net up at 1:59. ^tDictyonya and Zonaria; clean haul, except for algae. About 10 miles S. of No. 2 buoy, about 45 fms.

Gonodactylus digs by rapid motion of ambulatories, ducks head, and puts eyes together.

July 24, 1924, Thursday.

Dredged with Vellela along banks and shoals west side of Island —

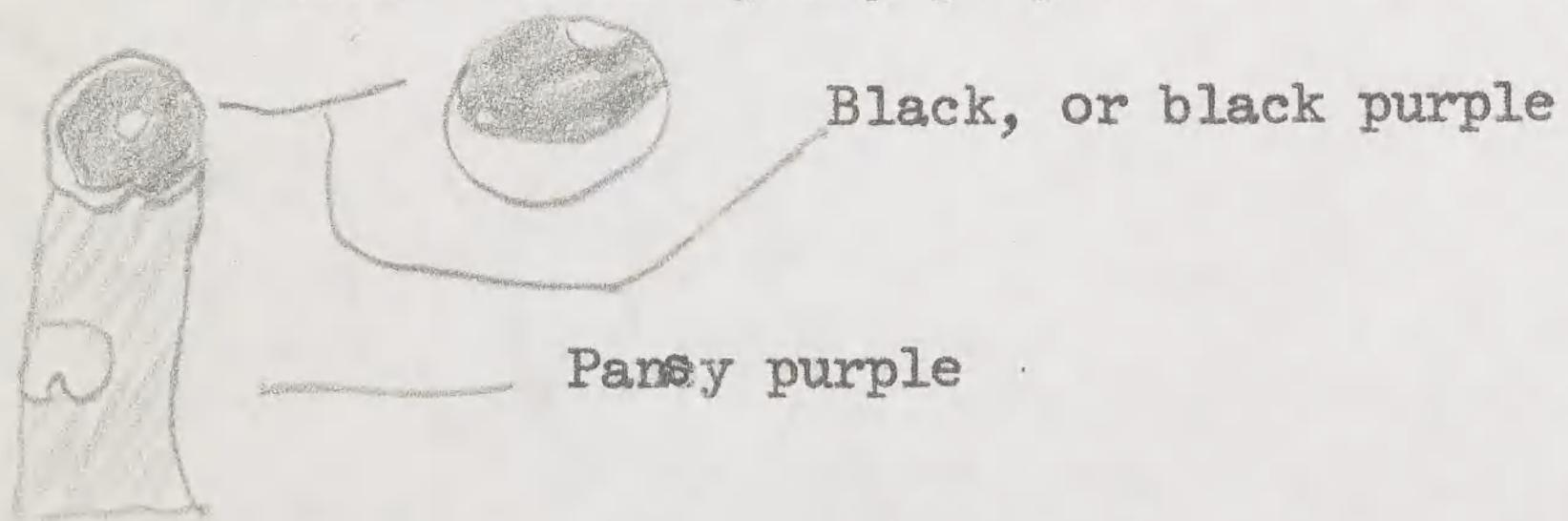
Loggerhead Key 30+4 feet. Loggerhead Sta. 15, 16, 17 combined, average about 30 feet water. Two Gebias living in Pholad holes in coral. Tail fan and integument white (pearly or china); hairs fringing tail fan and across abdomen straw yellow; abdominal contents of larger specimen flame scarlet, smaller thinner one colorless. Hands touched with salmon color.



Stomach forms block of purple — slate grey + Indian purple splotch in thinner, smaller specimen, being really noticeable only at sides.

Small Portunid (? depressifrons), legs Paris blue speckled on a pale blue ground. Tips and margins of dactyls pomegranate purple, hinder or upper margin of ambulatories brown (= brick red). Last two joints of paddles transparent with very few of the dark blue flecks. Middle 1/3 of carpal spine crimson; inside of fixed finger bright pomegranate purple; anterior meral spines on inner base ferruginous + madder brown. Back mottled vinaceous cinnamon, cream buff, vinaceous buff.

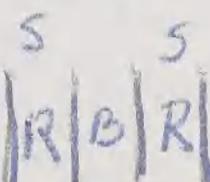
Smashed hermit pansy purple.



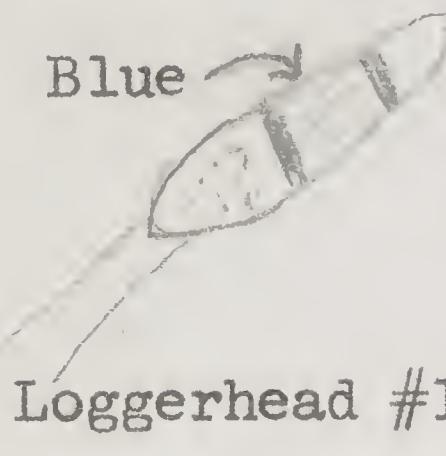
Legs purple, proximal ends white and distal end of dactyl, too; anterior portion purple
of carapace ~~purple~~ and white.



White
Purple

Epimera china blue; rest citron yellow dotted in diagram. Abdomen with medial stripe of walnut brown and lateral stripe  of geranium red.

Eggs scarlet.

Gonodactylus burnt umber with wood brown and near white markings near middle of length of legs, basal joint with spot of azure blue, rest of Blue  limb ocher yellow with golden spots; spots on figured joint blue.

Loggerhead #15, 10:00 a.m.

Dictyotya, 1 small blue legged Portunid. Bottom around 40-50 feet.
#16, bottom at 35 feet? Headed due south toward Loggerhead Light.
#17, between lighthouse and end of id. coral head section.
Loggerhead Haul #18, near old wreck at 1:30 on outer edge of Bank west of wreck.

Algae, Dictyotya.

#19--half way between wreck and buoy. Got Dictyotya with midriff looks like kelp.

July 25, 1924, Friday

Between 9:00 and 11:30 collected at Fort Jefferson from Halimeda pulled up inside moat. Got amphipods, few colorless shrimps, and a few tiny crabs, two isopods. From Hypnea one amphipod and two Palaemon species. From beneath Fort Jefferson landing pier, cook's boy brought me a number of portunids and a few Palaemon tenuicornis he had shaken from floating gulf weed.

July 26, 1924. Saturday

Went on Bird Key Reef in afternoon. Tide coming in 2 feet over reef, not so good. Bender got 2 Xanthids I hadn't seen. I was on so-called middle section of Bird Key Reef and Bender on southern section, or Bird Key Reef proper.

July 27, 1924, Sunday.

Schaeffer and the two Taylors left this a.m., bag and baggage and few clothes.

East side.

East side
Shore collected off rocks before lighthouse pier; got number of things. Alpheus makes sound on closing claw; definitely know this.

Low tide just after lunch. Last tiny pair of legs in Petrolisthes with brush, goes over other legs brushing them off or feeling them over. Saw one of little whitish ones go over last 4th leg of left side and next to last, 3rd leg, of right side. Found best collecting by carrying rocks as large as I could manage ashore and splitting them open. Found I believe all three of speckled claw Alpheids in one larger (1 inch in diameter) hole at bottom. Others crawled out on sand when I dropped rock on beach. Innumerable Mithraxxes everywhere in weeds, on rock, and in holes.

Dr. Grave and Bender brought me a tub of weed from moat. I washed through it and got a large Pseudosquilla ciliata and a good-sized Leptodius floridanus, lots of Thos. schalis, Thoe paschalis.

July 28, 1924, Monday.

Went collecting among the rocks today, east side of island and point north of lighthouse pier. Picked up as large pieces of coral rock and compacted sand (or coral) heads as I could carry and lugged them up on beach, where I split them open.

Got several *Eriphia gonagra* by prying open deserted sea urchin holes; would hide 'way back in small holes so that you would wonder how they ever got in and out. Of course, the small *Mithrax*, as usual, came in quantity. Not so many saved this second day on the same rocks.

Got more Crangons (several species) out of holes in rocks and several (3) fishes again. The *C. armillatus* are all tiny, with claws not over an inch long. 

Leptodius floridanus were all quite small and only a few on this day and the preceding. Squillas were, as usual, the most common crustaceans living in the holes. In rocks and on reef got grey, various shades of green, and brown. The rose red and bright yellow ones belong to the dredge hauls. Crangons run several to a large *Phola* hole-- $1\frac{1}{2}$ " diameter at bottom almost.

Dr. Longley and Bender collected on Bird Key Reef. Got at least a dozen Leptodius floridanus, all sizes, and as many Microphrys bicornutus decoratus, which Bender is trying experiments on, and several (two) smaller Mithrax spinosissimus, small, red, fuzzy, and spiny. Bender had a few *Mithrax* and one Xanthid that resembles them, but with long arms.

Reef crabs seem much like rocky ledge crabs on Loggerhead, but run larger in size. Live in interstices between rocks rather than dependent on *Pholad* and worm holes or ~~occasionally~~ occasionally deserted sea urchin holes. These [crabs] run large on the reef, though I got Crangon formosus large both places.

July 28, 1924, Monday.

The little isopods are the hardiest creatures; some were alive in a dish of debris in which everything else had died and water had odor by 10 o'clock the next morning.

Got another Epialtus and two somewhat Epialtus-like with bifid rostrum, more a hazel or chocolate than Epialtus. ~~Thrixumexaf~~ The one Epialtus of today's collecting had not ^{no?} cream center markings on carapace. Also got another Portunid.

July 29, 1924, Tuesday

If my identifications are right, Portunus (Achelous) ordwayi is predominantly reddish, Portunus ventralis depressiforms predominantly ¹¹ bice green.

Changed alcohol in morning. Didn't do much work, as this is mail day. Dohrn put in an early appearance, about two o'clock, with mail.

Cymopolias with sponges and also on coarse sandy bottom without any growth except few fragments of algae.

July 30, 1924, Wednesday.

Went seining in cove on south side of Long Key, made 3 hauls 50 foot
seine. Get a 75 ft. 6 feet deep.

Gathered a few bunches of sea weed in about 4 ft. of water out near
mouth of bight. Generally clean, sandy bottom with scattered tufts of weed.

Occasional bunches of Halimeda; one bunch--about double handful--pulled up and
put in bucket. Picked up 1/2 doz. fair-sized rocks in 4 ft. of water on
outskirts of Bush Key reef just where it runs into eel grass patch on west
side near Long Key. Bender picked up two Mithrax pilosus, and 2 Actea setigera,
and 2 Leptodius floridanus from rock above Fort Jefferson docks.

July 31, 1924, Thursday

Morning, cleaned up previous day's mess of collecting.

The Xanthids are very hardy. In a tub collected before yesterday noon, in which the water had become so stagnant that it had a decidedly bad odor, everything, numerous sea anemones were dead on the bottom and all the Mithraxes and Squillas, too. The two little Xanthids (Bush Key) and the one ~~large~~ lone isopod (the only one I found) were the ~~tiny~~ only living things.

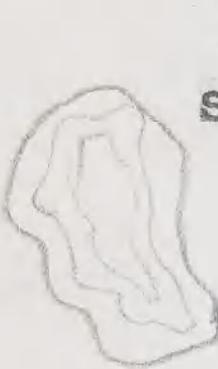
Out of Bender's Fort Jefferson dock collections the Acteas and Leptodius were the only things alive in the stagnant bucket this morning. They seemed dead, too, but revived on being transferred to a dish of fresh water. The green, hairless (on carapace) Mithraxes are very hardy, but the Xanthids last longer, that is, revive where the others won't.

In late afternoon, between 3:00 and 5:00 p.m., collected on southern end of Bush Key Reef, just north of channel. Got a number of crabs, but nothing new, and a carapace of a Calappa.

Brought back four pieces of seaweed overgrown dead coral, largest 1x2 feet, 3 smaller ones about 1 ft. ~~x~~ 6 in. Some holes in them. Cracked them in tub, scraped off ~~algae~~ algae. From washings got quite a number of crustacea, including another Epialtus, Lysmata, and a Gnathophyllum.

August 1, 1924, Friday

Friday afternoon collected on mid-section of Bush Key Reef, outside edge. Spiders all over, Xanthids, especially L. floridanus, where apparently spray washes over--literally thousands of them all sizes, and Eriphia gonagra in quantity.



Mid-section, Bush
Key Reef

Almost
stagnant
pool

In pool got large blue Xanthid.

S.
end

Outside: On rock some Grapsus grapsus.
One large female with eggs
that came down to spawn?

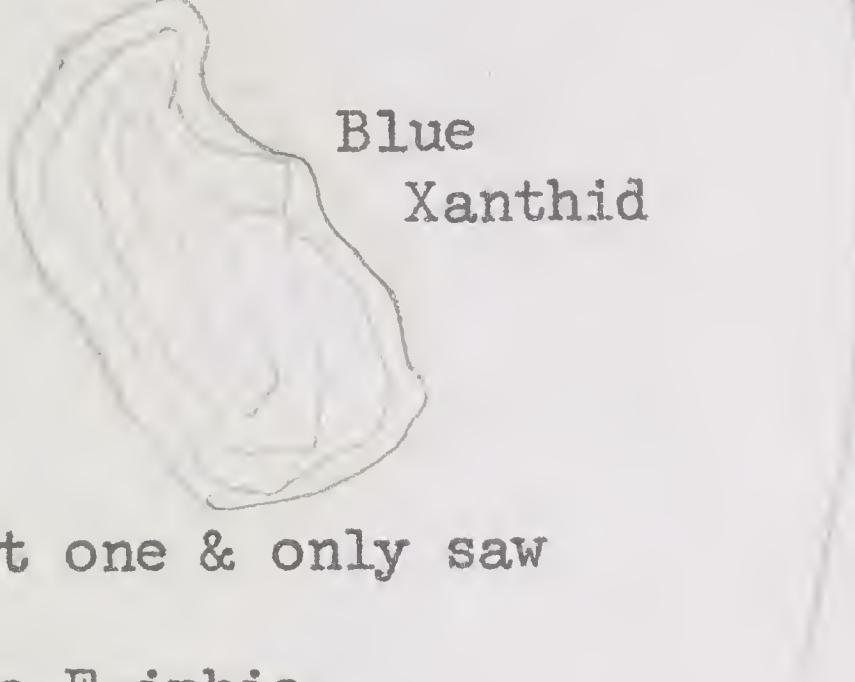
South end: Few Mithraxes, all small & tiny, and
some Microphrys on outer side of reef.

Washed lot of seaweeds from about 3 ft. water from inside of reef,

between it and eel grass bottom.

August 2, 1924, Saturday.

Cleaned up stuff collected yesterday. In afternoon, 2:30 - 4:20, collected on northern end of Bush Key Reef south of channel dividing it from the reef S.E. of Long Key, which reef seems to have much the same character. Seemed more dead than southern and middle portions.

| Bone dry | Nearly dry | Spray wet | Wave washed |
|--|------------|---|--------------------------|
| Stagnant puddle | Geograpsus | Clibanarius tricolor Eriphia (2) Leptodius (3 or 4, didn't get but 1) Pink xanthid - saved 1 | Microphrys + Calcinus |
|  | | | |
| Got one & only saw two Eriphia | | Heard snapping of shrimp and Squillas | |

August 3, Sunday.

10:00 - 11:30 a.m. Dredged off west side of Loggerhead Key between lighthouse pier and off N.W. of island. Haul 6 just west of island, 8-5 ft -- 1 tiny *A. erosa*. 2 hauls N.W. of island on rich bottom, mostly ~~conchs~~, cake urchins, and 1 large *Mithrax*. 8 hauls combined.

Dr. Grave gave me some crustacea found with his ascidians, two of them amphipods which ran in oral siphon for protection; 1 isopod and a shrimp.



Looks palest apple greenish, really transparent colorless. Last three but one of epimeral bearing segments olive ~~&~~ olive green, epimera of same segments lighter. Eye hazel under white network.

Transparent *Synalpheus*, flesh. Corneae with coal black speck in center. Antennae, antennules, legs, and tail fan with few opaque white specks. Stomach hazel.



hazel, faded out in clear area
All inside carapace.

10:00 - 11:30 a.m. Dredged off

August 3, 1924, Sunday

August 4, 1924, Monday. Ibis brought and took mail.

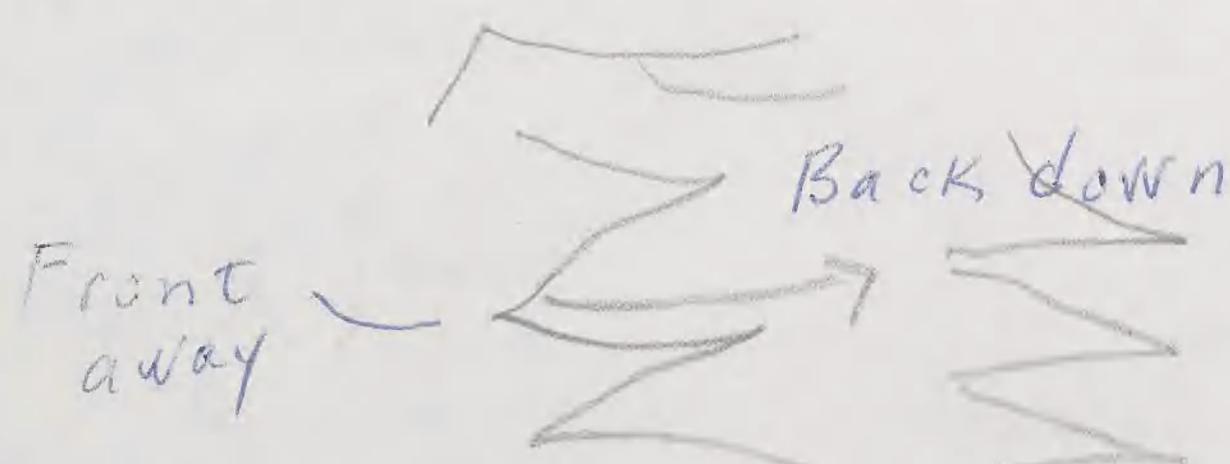
Tried crab nets over last night in Fort Jefferson moat, from entrance gangway. Got no crabs thusly, but from some bunches of seaweed from near intake pipe on S.E. side got several shrimps.

Soft grapsoid from around base of pile where it had rotted away from concrete footing.



Went dredging with Mills net off N.W. end (N.W. of lighthouse) of Loggerhead Key, about 3/4 to 1 mile off in average 10 feet of water; mostly eel grass bottom, some sand areas and, judging from hauls (made four or five hauls) broken coral fragments, 6-8 inches, many 1-2, all dead and much overgrown with lots of brown eel grass and many roots. Some hauls were made in as little as 5 feet, much same character bottom.

Charley got a Calappa in the moat, live, buried in sand. With chelipeds a little away from body kicks out with hind legs backward, pushes chelipeds away from the body, repeats, and so works way down in sand.



August 5, 1924, Tuesday

Used boat dredge looking for small green ascidian for Dr. Grave. Occurs 2/3 distance from wreck to buoy off S. end of Loggerhead Key in 18-20 feet water. Rocky coral head bottom, much of the attached kind of sargassum and the large, broad-leaved alga Taylor wasn't much interested in. One little pink sea urchin discarded; tiny crabs and amphipods saved.

Charley secured another Calappa with much more reticulating lines; lines finer and more numerous and reticulations more numerous, too. Antennules bright red (geranium red) with narrow white bands at joints.

Bird Key Reef Beach -- small Calappa ate pieces of conch foot left in over night.

Went dredging in area between Long Key and Bush Key reef; eel grass bottom and *Dictyota*.

Reef
Long Key
Fort
1
2
3
4
5
6
7
depth 5-6 feet, mostly 5 at all stations

4th & 5th hauls *Dictyota* and green filamentous felt. In first three got *Osachila* and *Tozeuma* and 1 or 2 Portunids. On 4 & 5, puerulus of spiny lobster and number of Portunids. (Bender tells me he never has seen ^{buried} buried lobster here.) Found a second puerulus, but it was all mashed. (Dexter says he has found tiny lobsters on dock piles at station. I have a small one, but Dexter has a much smaller one.)

*Calappa has incurrent opening between chelipeds and body. Blows out opening by reversal of current when they become clogged. Excurrent ^{stem} very powerful, shows at top of 5 or 8 inches of water, or 1/2 inch high 2 inches in front of body when half out of water, but that may be more to frighten enemy, as part of time it just bubbled over. Might have been just ^{playing} playing possum as it often does. Most crabs do.

August 6, 1924, Wednesday

Went dredging. Mills dredge in 20-25-30 feet. Made about 4 hauls; eel gras, loose rock, and coral fragment bottom. Got Chorinus here. 1 hermit, 2 shrimp, besides some other common things. Had to quit because of engine trouble shortly after noon; started at 10:30. Lighthouse about S. Fort S.E. x E. 20 feet deep; N.E. nearly north of light, Aug. 6, 1924, eel grass, rock, and broken coral. 25-30 feet light. be S & S.W. Fort E. & N.E., eel grass, rock bottom. Picked up one rock, 18" x 1 ft. x 6 inches.

August 7, 1924, Thursday.

Between 10:00 a.m. and 2:00 p.m. dredged around East Key, all on eel grass on middle ground between East and Middle Key. Got nothing.

Got a few good ascidians for Dr. Grave off south end of East Key in 10 feet of water, eel grass bottom.

1-5, ^{lost net}
on 5. To the south on East Key headed south on eel grass 10-15 feet. Made four hauls in this vicinity and lost Mills dredge on the fifth.

② #6+7 Made 3 hauls with boat dredge, one on east side of East Key, second from N. end toward Middle Key. Stopped at Channel. All hauls combined due to very similar bottom. Eel grass (- turtle grass) was patchy only, with sand and coral heads between.

③ #8 Along east side of Middle Key headed south, 10 feet water.

#9 ^{10 feet} Hauled across bottom end of Middle Key headed toward Sand Key, lots of Dictyota and eel grass. Got a clear, colorless puerulus except for hazel eyes and few inconspicuous opaque white spots; also opaque white strand between eyes.  Nerve strand?

④ Made several attempts to haul around Sand Key. Could barely get started but what dredge hooked. Gave up after several attempts.

⑤ #10 Hauled on Long Key Shoal, headed south toward Key about half way between the black can buoy on Iowa rock and Long Key. Eel grass and Dictyota, 3-4 feet deep.

Large Calappas called "queen crabs." Fuzzy, dark red Mithrax (pilosus?) "devil crabs."

August 8, Friday

Saw the bunch off after breakfast - Dr. Tennent and Dr. Grave.

Spent forenoon in laboratory getting caught up, solutions changed, etc. For once, feel up to date and not rushed. It has been the dickens up to now getting specimens cared for and what brief notes I have written up. Now everything is ship-shape for last two weeks.

Went dredging in afternoon. Made two hauls off S.W. of Bird Key on ^{#1 + #2} broken coral and broken coral rock bottom, lots of weeds and Diademas. Weeds mostly ^{10 ft. of} _{water} Dictyota, Hypnea, some Halimeda, and green tufted plumes short on stalks and the matted filamentous kind, some eel grass.

Then made one haul on what appeared pretty good eel grass bottom of S.W. ^{#3} corner of house south of piles of old foundation. Got several ascidians. _{10 ft.}

Then made two hauls on bottom similar to first two (1 & 2) on far east side of Bird Key Harbor in about 8-10 feet of water. Great many Pitho, some shrimps.

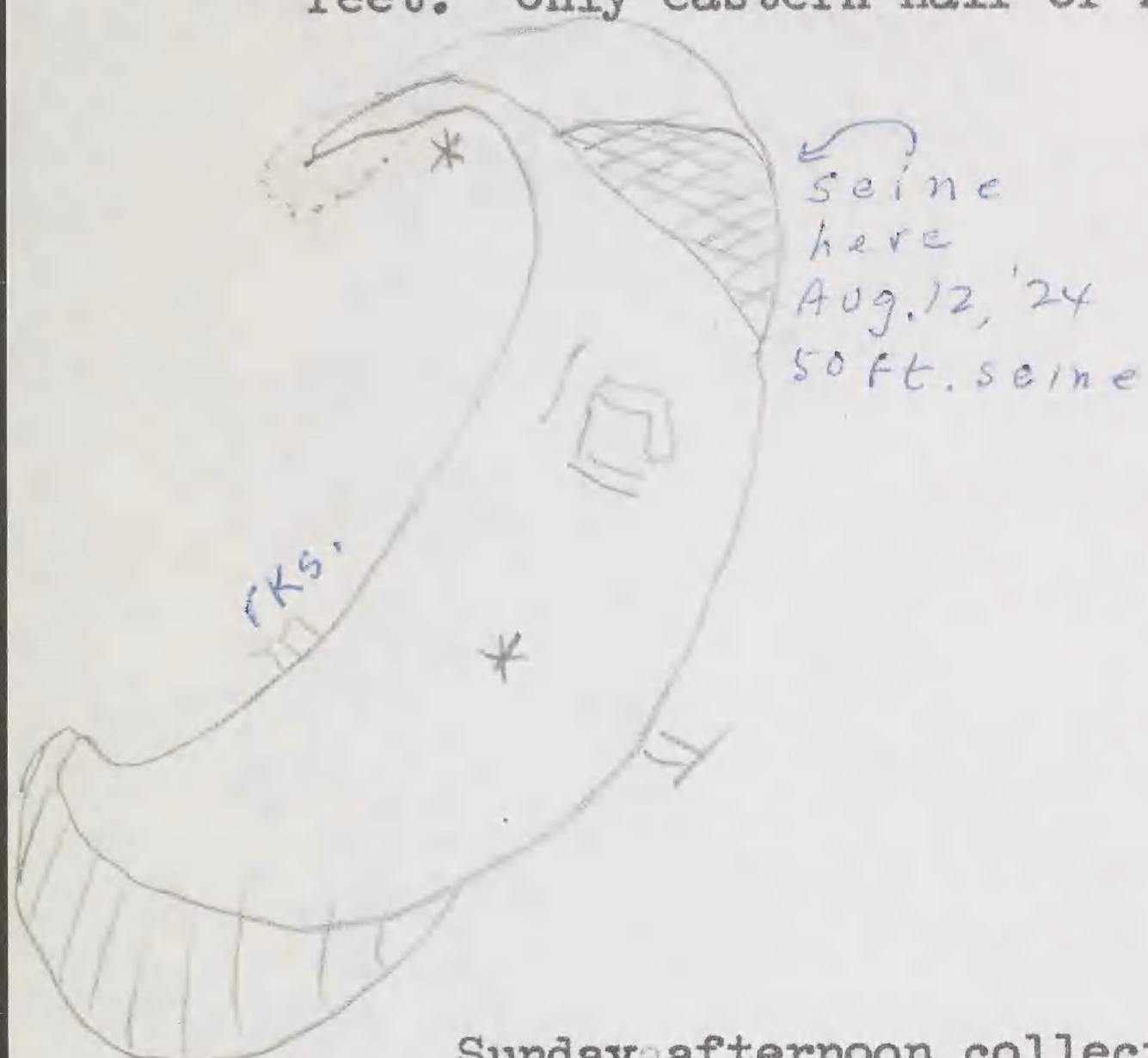
August 9, 1924. Saturday

Took me 3/4 of day sorting through several tubs of weeds obtained yesterday. Of course, noticeable things were picked out on launch at time of dredging, but in the seaweed found very little as compared to other times, Undoubtedly due to fact that it must have begun to macerate. It certainly did not keep well over night. Should be washed out same day. Doesn't pay to get too much.

Squillas make most of noise on reef. Have never yet seen them spiny dactyls, which, when you come to think of it, are quite weak. Always knock you with bulbous base on the snap. As sharp and sudden as when you snap pencil against leg or ? against your finger.

August 10, Sunday Loggerhead Key

In the forenoon went up the beach looking for Hippas, but saw no traces. Even attempted to dig in what appeared to be likely places. Along west side, sandy bottom, few weeds, and no rock. Poor shore collecting up to $4\frac{1}{2}$ feet. Only eastern half of northern flat had some rocks on it; these, cracked



up, yielded a number of things, including a brownish Portunid. A conch shell yielded two Portunids; the larger more bluish, soft; the smaller hard but it went to pieces over night. Picked up rock in shaded area, from which I obtained specimens collected at north end of island on this date.

Sunday afternoon collected along beach and in shallow water along west side of Loggerhead Key. Practically no rocks inshore, and those noted south of west side lighthouse pier didn't have much on them. Water, inside of S. point and to north of it up to rocks, runs off quite steep to 6 or 8 feet, weedy bottom, but few rocks that can be cracked open. Got a few things from weeds. Around to east of S. point is a large shallow over which tide rips run; got just a few large rocks here about 1" x 6" x 8", about all there were; very little in them--squillas, fish, and few small crangons.

From rocks just to north of west side lighthouse pier got a few tiny young stages of *Pachygrapsus*, and on beach nearly two tiny *Ocypodes*.

From well off southern point Dr. Longley brought up large rock, 2'x18"x18", which yielded usual run of rock stuff, some grey *Petrolisthes*, and *Crangon formosus*.

August

August 11, Monday.

Spent forenoon getting yesterday's stuff in shape. In afternoon stayed in moat till dinner time, between 1:30 and 4:30 actually in moat in skiff.

Found that Cassiopea rarely swims; is usually upside down in sand. Looks all the world like bushy hydroid or alga. Got several Dromias, Lygias, and Sesarma, taken from under shoals in "five foot" channel N. of Bird Key reef. Found no traces of Calappa, though looked hard. Charley said he only noticed large one he got some days ago because it was but half buried.

August 12, 1924. ~~Thursday~~ ^{Tuesday}.

Seined just inside N.W. point (n. end) of Loggerhead Key. See sketch of Aug. 10. Got Pompano and jacks and several fishes that Dr. Longley had not yet seen, a few blue-legged Portunids, and two Podochelæs. Earl Sands got several large lobsters, speared. Largest, exclusive horns to tip of telson $14\frac{1}{2}$ in., $4-1/8$ in. wide across widest part of carapace, 3 ft. $6\frac{1}{2}$ in. from ~~time~~ ^{tip} of longest feeler to end of telson.

In afternoon worked northern section of Bird Key Reef (Benders channel reef) (2:00 - 4:00 p.m. actually on reef). Got a *Latreutes ensiferuns*, wax yellow, floating around in tiny tide pool among weeds, and more of general run of common stuff--3 long-armed Xanthids, 1 medium and 2 small = dark middle over lap of Rid. bay.

1924,
August 13, Wednesday.

Cleaned up yesterday's collections this a.m.

In afternoon worked south end of Bird Key Reef. Is very sandy and that seems to keep down size and variety, fewer large Mithrax than on northern end, and the Leptodius is much smaller. Crangons seem to be all the greenish kind, and the small squillas, however, fewer sand due to greater amount of shoal water and lack of a channel.

check a
this

August 14, 1924. Thursday

Cleaned up yesterday's stuff and went through a large loggerhead for "shrimps" two halves of sponge, that is, contents of, bottled separately. Sponge was about 18 inches in diameter across the top and 12 inches across bottom and 12 inches high.

In afternoon, owing to fact that I had to finish up the second half of the sponge after lunch, went out near three looking to see if part of Long Key Shoal would be out of water at low tide. Lowest place was $2\frac{1}{2}$ -3 feet under water (where we bumped the other day). Here I picked up some perforated and weedy rock and an old worn conch shell which had 3 reddish brown Mithraxes in it--are these color phases of the green one with two spines on carpus?

Got about 6 *Epialtus bituberculatus* from *Hypnea*.¹ Saw one large medium *C. formosus*.

August 15, 1924, Friday

Cleaned up yesterday's rocks and weeds this a.m.

In the afternoon got about an hour on mid section of Bird Key Reef.

Saw few *Eriphia gonagra*; gave Bender one I caught. Saw many squillas and caught a few. Some of specimens put in sugar solution. Shrimp with apple green eggs and some similar marking walked about with abdomen tilted high in air.

The *Mithrax pulmoris* ? (hairy one) was on outside of reef where surf comes in.

August 15, Friday
12

August 16, 1924, Saturday

Dredged with the Dohrn; made 9 hauls on about a S. course from channel buoy. Ran 30 mins. due south of buoy.

#1, 20 fms.? Dredged at 9:20, 15 min. tow. Net on deck at 10:45. Little grey ooze and grey sand; Mills net carried away, boat dredge hanging by one side only; one tiny fragment of alga.

#2, 20 fms. Same course, net over at 9:50, up at 10 o'clock. Coarse, (brk) shelly, sand.

About 10 miles S. of S.W. Channel buoy.

#3, 25 fms./ Net over again, same course, at 10:05; on deck at 10:30. Coarse sand and shell fragments.

#4, 37 fms. At 11:10 a.m., 37 fms., net up at 11:35. Soft grey ooze like wet cement ~~xxxxxxxxxxxxxxxxxxxxxx~~ with no sand, or practically none. 1 Lyreidus from the mud; 1 small starfish.

#5, 35 fms. Headed back at 11:45, N. Net over at 12 noon; muddy-grey ooze bottom and fragment of alga wanted.

30 fms.
#6,/ Net up at 1:15 p.m. Coarse sand and little more of desired alga.

Added to preceding under #5.

#7, 20 fms. Net in at 2:30. Coarse sand, shelly. About 9 miles.

#8, 25 fms. Running S.E. from #7. Net up at 2:45. Sand mixed with some mud, as before.

#9. Turned back toward light at 2:40 (about $1\frac{1}{2}$ hr. run). Sounded at 3:15, 20 fms. (headed half way between N.W. and N.). More than a bucket of sand dollars. Net up at 3:40. Passed buoy at 4:25 p.m. Mills says this haul is 45 minutes S.E. of Buoy.

Dr. Longley got a large Peneus he saw swimming as they were going over to the Fort in the Darwin. As they went to get it, it took refuge in some floating gulf weed. Scooped up with dip net. Earl got a small to medium Calappa on weeds in Fort near sewer pipes where he went to dip up a jellyfish.

August 17, 1924, Sunday.

Forenoon and afternoon cleaned up yesterday's stuff.

10 feet water N. end Loggerhead Reef, Dr. Longley brought in a beautiful large Stenopus hispidus. Lives in holes in coral heads with long antennae giving it away. Caught by disturbing, and when it comes out to see what the trouble is. (Just like spiny lobster and tickler.) Dr. Longley says almost every large coral head harbors some (or a pair); not uncommon.

Bender cleaned out a few sea urchins and threw remains on beach.

Noticed that they disappeared and saw bits of them sticking out of sand. Taking up a finger grasp of sand, found Portunid marked with slate (Portunus ventralis A. M.-Edw.) in sand slope between ^{top of island} beach and bottom.

Just before supper put in half hour on rocks at Fort; got few common things.

Copy sketch, bot. p. 108?

August 18, 1924, Monday.

Cleaned up yesterday's stuff and in afternoon, 2:00 o'clock, went down on rocks below lighthouse pier. Got a few bunches of weed and a couple of shrimps from gulf weed (east side).

Bender walking along shore saw a *Plagusia* sliding over rocks just below surface. He called me; I was wading out in deeper water with the water glass, and, coming up behind, slapped the little dip net over him. This was the second Bender had seen; the first one got in a crevice among the rocks and got away.

Also found piece of a *Hippa* shell on beach and pieces of legs. Got a *Crangon* and an *Epialtus bituberculatus* from the weeds.

August 19, 1924, Tuesday

1. Went over after breakfast to collect on breakwater at N. or N.E. end of Fort, N.E. corner of N. coal dock. Just got a bucket of weeds from two rocks; too rough and windy to do more.

2. Then went around to lee side of moat wall, between beach and south of entrance to moat. Bender got several swimming crabs with my dip net; I missed about 6 chances with small hand dip net. This is maybe best place for swimming crabs. Sandy areas and eel grass patches, in about 4 feet of water. Two largest were soft.

August 20, 1924. Wednesday

Tide was lowest about 8:30 or 8:40, though scheduled

Callianassa burrows, laying antennae back along back; antennules are extended between chelipeds; chief digging with side legs, abdomen folded up upon itself as soon as carapace is buried in sand.

(1) Bird Key reef not out at this "low" tide.

(2) ^{Then} Tried Bush Key reef in two places, throwing shovels of sand in dredge table. First place, sand and coral fragments, got one Crangon (heterochaelis?), and in a more sandy place, sort of little beach, got nothing.

(3) Went over into seining inlet and dug around the humps in sand with holes in them. ~~about~~ In about third shovelful got a Callianassa, but it was the only one I could ~~dig~~ dig up in a very considerable number of attempts.

Apparently was in the top of its burrow when I happened to strike.

August 21, 1924, Thursday.

Wanted to seine on Sand Key and collect on rocks, but Dr. Longley thought it would be too rough (and also too much like Loggerhead Key). (In walking along higher parts of beach the boys got three 2-inch Calappa shells, one $2\frac{1}{2}$ -inch long Chorinus, a portunid, and an Eriphia.)

(1) As result, went around south end of Island looking for Hippa. Offered kids 50¢ for first live one, but have yet to get it. No signs on beach; dug in several places that looked likely, and looked along wash of waves with water glass, but found nothing. Looking around on rocks, saw a very large spiny lobster and secured a large *Mithrax verrucosus* from a hole in rock which had two openings. Chased him by means of one out through other and picked him up with dip net.

(2) Dexter and Earl went seining in cove at north end of island; got a few more Portunids, as on previous occasion, as well as fish; and one like those Bender baited out of sand, only with reverse coloration on carapace.



Central area slate, lateral grayish. Put in sugar solution.

Dr. Longley, while studying fish off Bird Key Reef, brought in 8
? *Dissodactylus* taken from three or four urchins. Brought in three urchins, of which I saved one or two, which I opened to see if any Pinnotherids might be in alimentary tract. Got nothing.

August 22, 1924. Friday.

Went down on rocks below lighthouse pier; got a few crabs [which] were put in bottle, but not labeled as it had to be packed too soon. Got a *P. grayi* in small conch shell; had to break part to get it in bottle.

In a long, rather deep crevice, saw several (4 or 5) Percnons, I am quite sure, pulling weeds off rocks with chelipeds. Had bright (brilliant lemon or brighter) yellow markings and edgings, antennules ditto; otherwise, a rich brown, tawny ochraceous with darker (= burnt umber) black-brown spines and markings. Couldn't catch any.

Fermin brought in three *Pachygrapsus* and a *Dromia* from around dock piles. One put in bottle with above, but unlabeled.

August 23, 1924. Saturday

Went down on rocks again for an hour and a half actual time on rocks below lighthouse pier to get a Percnon if I could, but they still eluded me. One needs a sort of spring contrivance which shoots out hooks to catch wary crabs like these in tight or close quarters like rock crevices. -- Hooks that will shoot down and in when released, or something in a pipe that will snap out.

sketches?

Dr. Longley gave me a *Hippa* that had been taken earlier in season, I suppose ^{on} a beach near dock where Bender said he found one, too, earlier in season.

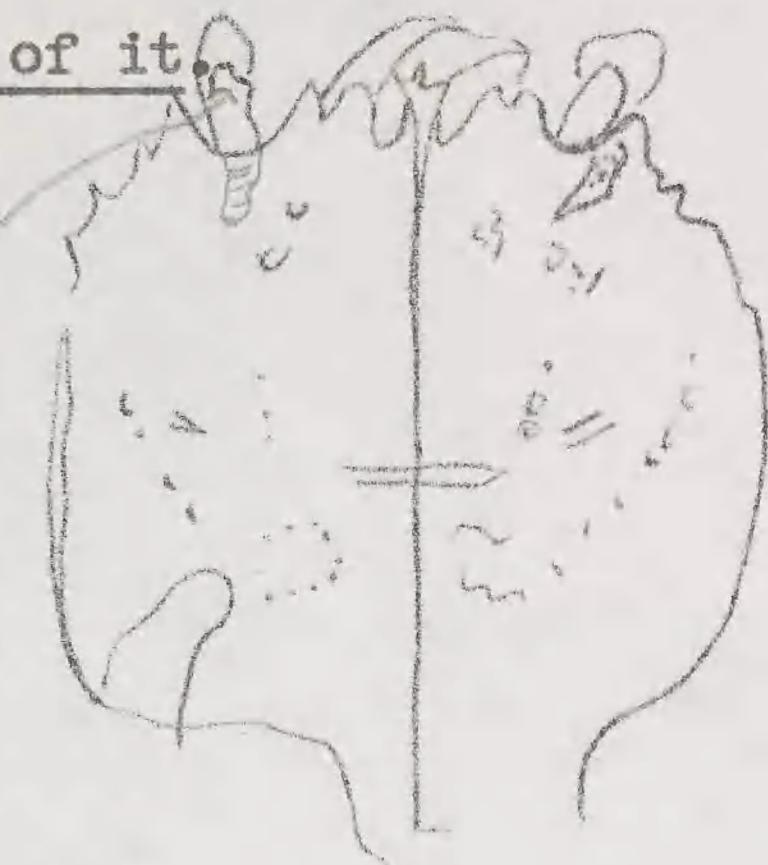
August 24, 1924. Sunday.

Got my Percnon this morning, for that is what it proved to be. That is,

I got most of it.

*

This line green
like below
citron yellow



Lateral rostral spines & antennular flagella
citron yellow* & bars on lateral spines.

Areas ~~on~~ on carapace behind eyestalks golden
greenish, apple green with a golden irri-
descent cast. Rest of spots and median and
transverse lines dull apple green (between
apple & malachite green)

Fringehairs fore and
aft on meral joints almost
sepia

x This part of merus
poppy red

Corneae
hazel

Propodus
mostly a
claret
brown
with
chestnut
basally

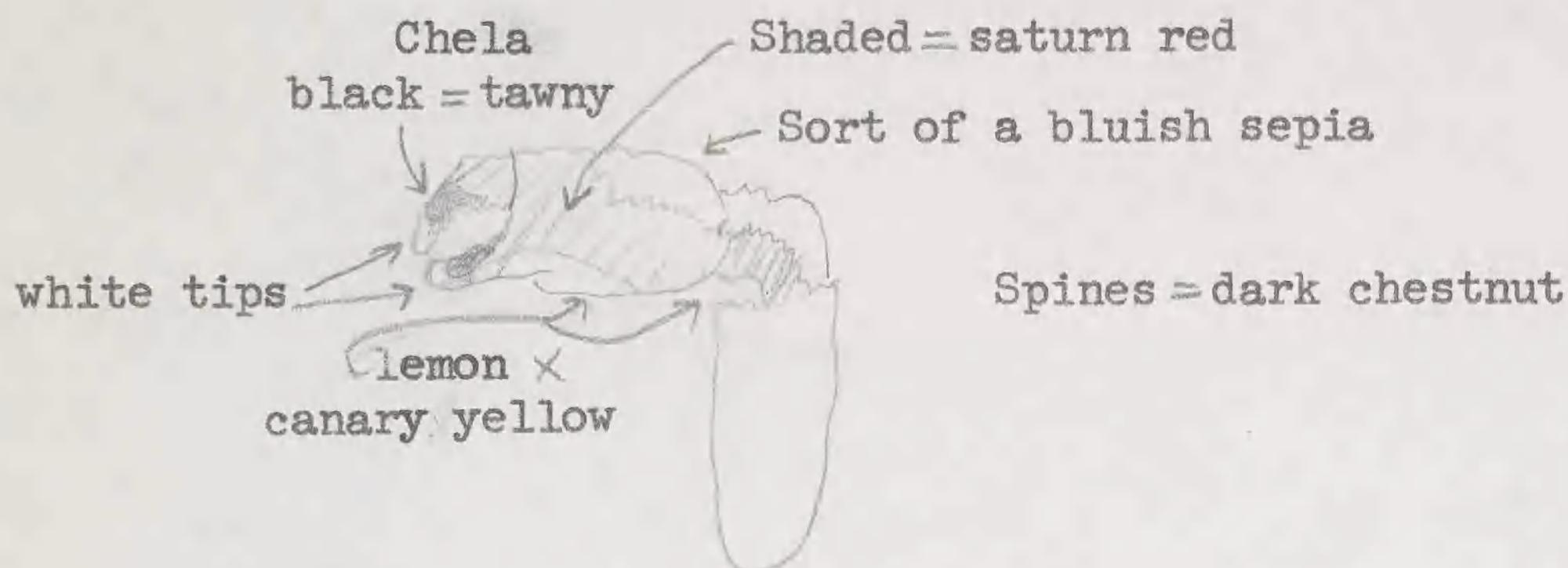
maroon & carmine
light, horn-colored corneous claw
yellow bar

Under here on anterior side is wavy
line  fading out at both ends of
citron yellow*

Meral spines yellow, maroon
tips, 2nd row of small spines
all maroon

All yellow = lemon x
and canary yellow
Darker parts burnt sienna bay
and chestnut shades.

August 24, 1924, Sunday -- Continued



Citron yellow line running around front begins just beneath margin of touches? carapace, on epimera, in front of ischium of 4th legs, touch ventral border of orbit and is half on either side of row of five spines above maxillipeds.

Beneath red is same place on ~~xx~~ under side of merus, under side of propodus and carpus claret brown ~~bay~~, yellow as above but less of it. Dactyl as above.

Abdomen scraped off. Under side of legs plain. Basis and ischium = straw yellow; ~~maxillipeds~~ anterior half of merus = dark raw sienna; posterior half = light raw sienna.

Also got a large fuzzy red Mithrax this morning.

After lunch hauled the 50-foot seine once with Dr. Longley for minnows. Got some large, but mostly small, and 6 squid, of which I preserved 2, and the two Portunids; all today's junk bottled in a 1-qt. mason jar, unlabeled, and shipped in separate small acid box.

Finished packing and shaved, already to go.

August 24, 1924, Sunday == Continued

August 25, 1924. Monday

Slow, uneventful trip. Left at 7:20, got in Key West about 5:30. Got money order and went to R.R. office to [get] ticket. Met _____ Van there, he took me home to meet his wife, Mary Wells.

Rushed back to ship to get luggage. Made hasty goodbyes, missed Mills, and after some little driving around town, they took me to the train.

August 26, Tuesday, enroute.

Breakfast .65 + .20; lunch \$1.25 + .25.

Mailed request to station express agent at Key West to send earphone to Takoma Park.